IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of: **Takeo TANAAMI**

Art Unit: **1744**

Application Number: **10/716,417**

Examiner: **Nathan Andrew Bowers**

Filed: **November 20, 2003**

Confirmation Number: **6545**

For: **BIOCHIP CARTRIDGE**

Attorney Docket Number: **032106**
Customer Number: **38834**

SUBMISSION OF APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

August 6, 2008

Sir:

Appellants submit herewith an Appeal Brief in the above-identified U.S. patent application.

Attached please find a check in the amount of $510.00 to cover the cost for the Appeal Brief. If any additional fees are due in connection with this submission, please charge Deposit Account No. 50-2866.

Respectfully submitted,

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
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APPEAL BRIEF FOR THE APPELLANT

Ex parte Takeo TANAAMI et al. (Applicant)

BIOCHIP CARTRIDGE

Application Number: 10/716,417

Filed: November 20, 2003

Appeal No.:

Art Unit: 1744

Examiner: Nathan Andrew Bowers

Submitted by:
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Date: August 6, 2008

BRIEF ON APPEAL

(I) REAL PARTY IN INTEREST

The real party in interest is **YOKOGAWA ELECTRIC CORPORATION**, by an assignment recorded in the U. S. Patent and Trademark Office on **June 15, 2004**, at Reel **014729**, Frame **0844**.

(II) RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to appellant, appellant's legal representative, or assignee that will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(III) STATUS OF CLAIMS

Claims 2, 4-13 and 19-25 are rejected and are appealed. Claims 1, 3 and 14-18 are cancelled. The appealed claims appear in the claims appendix.

(IV) STATUS OF AMENDMENTS

Claims 14-18 were cancelled in the Amendment under 37 CFR 41.33(b) filed on July 29, 2008. This Amendment has not yet been acted on by the Examiner.

(V) SUMMARY OF THE CLAIMED SUBJECT MATTER

Independent claim 2 recites:

A biochip cartridge 100 comprising:

a tabular substrate member 110 formed using an elastic material (*e.g.*, page 10, lines 16-17); and

a flexible cover 101/102 airtightly attached to the surface of said substrate member 110 (*e.g.*, page 10, lines 14-16 and 17-20),

wherein at least a collection area 112 for storing biopolymers (*e.g.*, page 11, lines 11-15), a preprocessing area 115 for applying preprocessing to said biopolymers (*e.g.*, page 11, lines 16-18), a detection area 116 for detecting biopolymers from said preprocessed biopolymers (*e.g.*, page 11, lines 19-23) and gaps 118 serving as a flow path for connecting said collection area 112, said preprocessing area 115 and said detection area 116 are formed in said substrate member 110 (*e.g.*, page 10, lines 21-27), so that biopolymers can be successively transferred from said collection area 112 through said preprocessing area 115 to said detection area 116 (*e.g.*, page 12, lines 12-15 and 28-30), and

wherein said biopolymers are transferred by pressing said cover 101/102 with a roller-like rigid body 200 and squeezing each gap 118 formed in said substrate member 110 from said collection area 112 through said preprocessing area 115 toward said detection area 116 (*e.g.*, page 12, lines 12-15 and 28-30).

(VI) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether claims 2 and 4-13 are unpatentable under 35 U.S.C. §103(a) over Christian (U.S. Patent No. 4,708,931) in view of Schembri (U.S. Patent Application Publication No. 2004/0087033), the Applicant's admitted prior art (APA), Wilding (U.S. Patent Application Publication No. 2006/0223166), Anderson (U.S. Patent Application Publication No. 2005/0202504) and Childers (U.S. Patent Application Publication No. 2004/0086872).

Whether claims 19-25 are unpatentable under 35 U.S.C. §103(a) over Christian in view of Schembri, the Applicant's admitted prior art (APA), Wilding, Anderson and Childers, and in further view of McGarry (U.S. Patent No. 6,642,046).

(VII) ARGUMENT

Claims 2 and 4-13 are not unpatentable under 35 U.S.C. §103(a) over Christian in view of Schembri, the APA, Wilding, Anderson and Childers.

It is the position of the Examiner that Christian discloses the embodiments as claimed, with the exception of the teaching of the substrate being formed using an elastic material and the teaching of the biopolymers and biopolymer solutions being transferred sequentially from a storage area to a preprocessing area to a detection area to a waste reservoir in a time-differentiated manner. The Examiner relies on Schembri to teach the elastic substrate, and relies on the APA, Wilding, Anderson and Childers to teach the sequential transferring.

1. Discussion of the cited art

Christian discloses in Figures 12 and 13 a card 121 including a bottom 152 and a top 150 which is a cover layer 134. (Col. 12, lines 17-19 and 64-68). The card 121 includes a closed channel 122 in which a microassay rod 10 is inserted, where a reaction takes place. (Col. 12, lines 21-24). Closed channel 122 is provided with an opening 126 into which sample solution is inserted. (Col. 12, lines 27-29). The card 121 also includes closed channel 123, which may include a wash solution, closed channel 124, which may include a detecting solution, and closed channel 125, which also may include a wash solution. (Col. 12, lines 24-27). These closed channels 123, 124 and 125 are connected to closed channel 122 via conduits 131, 132 and 133. (Col. 12, lines 46-61). The card 121 is designed to be used with solenoid operation roller 130. (Col. 12, lines 41-46). This roller will squeeze solution out of each of the closed channels in a specified order so that one or more microassays may be done. (Col. 12, line 68 to col. 13, line 4).

Schembri discloses in Figure 4 an integrated microfluidic array including a bottom portion 334, which includes an array substrate 382. Schembri discloses in paragraph [0083] that the array substrate should be flexible. Schembri discloses that external pressure is used to move solutions through the microfluidic array. Paragraphs [0099]-[0100].

Each of Wilding, Anderson and Childers appear to disclose assay systems wherein a sample is sequentially moved from a collection area to a pre-processing area to a detection area. (*e.g.*, Wilding, paragraph [0084]-[0085]; Anderson, paragraph [0168]; Childers, paragraph [0061]). It is noted that in each of Wilding, Anderson and Childers, the assays systems are complex, and involve PCR. (*e.g.*, Wilding, paragraph [0085]; Anderson, paragraph [0169];

Childers, paragraph [0069]). Further, the movement between areas of the biochip in Wilding, Anderson and Childers is performed by an external pump or pressure difference, and not a roller. (*e.g.*, Wilding, paragraph [0083]; Anderson, paragraph [0179]-[0180]; Childers, paragraph [0099]). On the other hand, the Christian discloses that "no sophisticated machinery is required." (Column 4, lines 9-10).

Similarly, the APA discloses moving a sample sequentially from a collection area to a pre-processing area to a detection area in Figures 5 and 6. However, unlike the claimed embodiment, which requires that the biopolymers are moved by pressing a rigid roller on a flexible cover, the APA discloses in Figure 6 that the biopolymers are moved by a pair of rollers 61 and 62 on a blood collection bag 41.

2. The proposed modification of the cited art.

The Examiner indicates that it would have been obvious to modify the existing structure of Christian to include the flexible substrate of Schembri. The Examiner further indicates that it would have been obvious to modify this combination of Christian and Schembri to include a new sample inlet port, collection area and preprocessing area, while maintaining the existing wash chambers of Christian. While the Examiner explicitly stated that wash chambers 123 and 125 should be retained, it is unclear what the Examiner regards the role of detection solution chamber 124 would be in the proposed combination. The Examiner illustrated the proposed modification on page 13 of the Office Action of March 7, 2007. That illustration is reproduced on the following page:

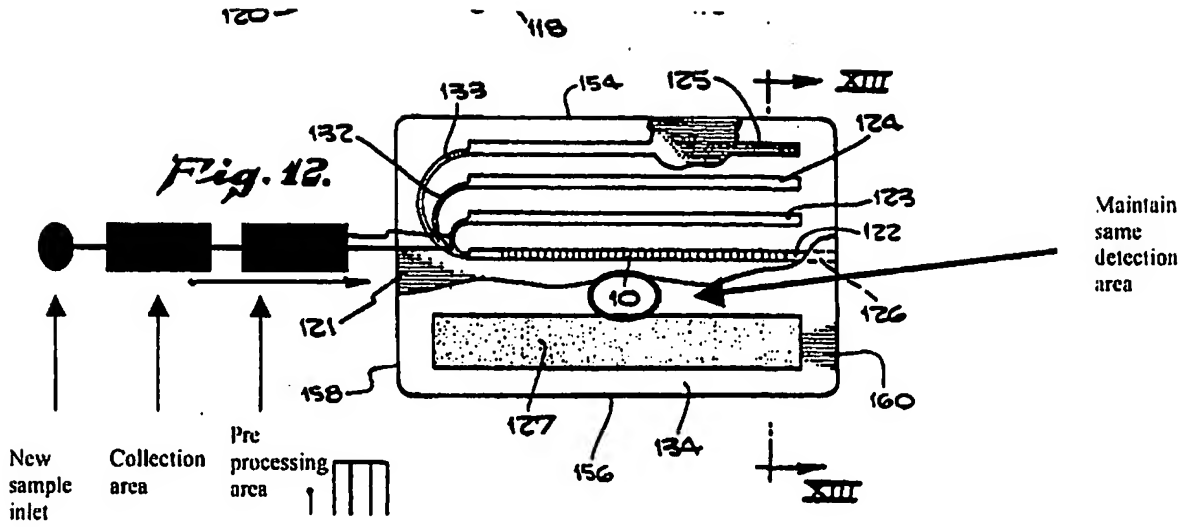


Fig. 12.

3. Change in principle of operation

In the Amendment submitted on August 30, 2007, Appellants argued that the proposed modification of the combination of Christian and Schembri to include sequential transferring would change the principle of operation of the combination of Christian and Schembri.

First, Appellants argued that the proposed modification of the combination of Christian and Schembri would change the principle of operation of the device of the combination of Christian and Schembri from a biochip in which reagents are moved in "parallel" to one in which reagents are moved in "series." As illustrated in Figure 12, Christian discloses a "parallel-type" device. Each of the various chambers 123, 124 and 125 of solution are individually arranged so that solution flows directly to the detection chamber 10, without passing through another chamber 123, 124 and 125. On the other hand, Wilding exemplifies an example of a "series-type" device. As illustrated in Figure 16, solution from chamber 22A must pass sequentially

through all other chambers 22B and 164 in order to arrive at chamber 165. Anderson, Childers and the APA disclose similar "series-type" devices. More specifically, Appellants argued that the proposed modification actually results in a hybrid of a "parallel" device and a "series" device. In such a hybrid device, some chambers are sequentially arranged (those on the left side of the illustration), while others are arranged independently of each other (those on the right side of the illustration, originally disclosed in Christian). In addition to requiring a more complicated usage as well as a substantial reconstruction and redesign of elements, this would give rise to problems, such as contamination of samples and solution.

Furthermore, Appellants argued that the proposed modification of the combination of Christian and Schembri would change the principle of operation of the device of the combination of Christian and Schembri from a roller-based device to a pump based device, and from a tabular substrate device to a bag device. Appellants respectfully note that the sequential series-type devices cited by the Examiner operate under different principles of operation than Christian. First, each of Wilding, Anderson and Childers disclose complex assay systems and involving PCR, wherein a sample is sequentially moved from a collection area to a pre-processing area to a detection area. The movement between areas of the biochip in Wilding, Anderson and Childers is performed by an external pump or pressure difference, and not a roller. See Wilding, paragraph [0083]; Anderson, paragraphs [0179]-[0180]; Childers, paragraph [0099]. On the other hand, the APA discloses moving a sample sequentially from a collection area to a pre-processing area to a detection area in Figures 5 and 6. However, the APA discloses in Figure 6

that the biopolymers are moved by a pair of rollers 61 and 62 on a blood collection bag 41, rather than by pressing a rigid roller on a flexible cover of a tabular substrate.

The Examiner has not cited any references where a solution can be sequentially transferred by a simple roller on a tabular substrate. Wilding, Anderson and Childers all disclose sequential transferring on a tabular substrate, but disclose that sophisticated machinery such as an external pump is needed in order to move the solutions. Meanwhile, the APA discloses sequentially transferring using no sophisticated machinery (only a simple roller), but the device must be a bag device.

Thus, if the combination of Christian and Schembri was modified to include the sequential transferring of Wilding, Anderson and Childers, an external pump would be required. Christian discloses that "no sophisticated machinery is required." Column 4, lines 9-10. However, each of Wilding, Anderson and Childers requires external pressurization. Likewise, if the combination of Christian and Schembri was modified to include the sequential transferring of the APA, the device would have to be modified to be a bag device. This carries drawbacks discussed on pages 6 and 7 of the specification.

Thus, in order to retain the benefits of Christian, the modifications of the combination of Christian and Schembri discussed above would require a substantial redesign of the device and would change the principle of operation of the combination of Christian and Schembri. That is, if Christian and Schembri were combined with any of Wilding, Anderson and Childers, the principle of operation would have to be changed from a complex pump-based system to a roller based system. Alternatively, if Christian and Schembri were combined with the APA, the

principle of operation would have to be changed from a tabular substrate to a bag device. Without such a change in the principle of operation, the proposed modification would either lose the benefit of simplicity and low-cost or lose the benefit of the absence of the drawbacks of a bag device. *Prima facie* obviousness is not established when the "suggested combination of references would require a substantial reconstruction and redesign of the elements shown in [the primary reference] as well as a change in the basic principle under which the [primary reference] construction was designed to operate." MPEP §2143.01, quoting *In re Ratti,* 270 F.2d 810, 813, 123 USPQ 349 (CCPA 1959).

In response, the Examiner stated that:

> It is agreed that the redesign of Christian would require changing the principle of operation from a biochip in which reagents are moved in "parallel" to one in which reagents are moved in "series." However, this does not constitute a substantial reconstruction and redesign. (emphasis added). November 13, 2007 Office Action, page 12.

Thus, the Examiner conceded that the proposed modification changed the principle of operation of the combination of Christian and Schembri, but downplayed the significance of such a change in the principle of operation, arguing that this would be a "simple rearrangement of parts." The Examiner's reference to a "substantial reconstruction and redesign" appears to be based on the above quotation from *In re Ratti.*

In the Response filed on May 9, 2008, Appellants argued that with respect to the proposed redesign, like in *In re Ratti*, once Appellants had taught how this could be done, the redesign may, by hindsight, seem to be obvious to one having ordinary skill in the art. However, when viewed at the time of Appellants' invention was made, and without the benefit of

Appellants' disclosure, one having ordinary skill in the art would not have had a reason to modify the cited art in order to arrive at the claimed embodiments. It is noted that "[t]he mere fact that a worker in the art could rearrange the parts of the reference device to meet the terms of the claims on appeal is not by itself sufficient to support a finding of obviousness. The prior art must provide a motivation or reason for the worker in the art, without the benefit of appellant's specification, to make the necessary changes in the reference device." *Ex parte Chicago Rawhide Mfg. Co.*, 223 USPQ 351, 353 (Bd. Pat. App. & Inter. 1984).

Additionally, it is impossible for a design change which modifies the ***principle*** of operation to be anything but substantial. The Office Action conceded that the proposed modification changes the principle of operation of the closest cited art. Appellants reiterated that, as explained in MPEP §2143.01, if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious.

In the Advisory Action dated May 27, 2008, the Examiner addressed the argument that the proposed modification changes the principle of operation of the device. The Examiner acknowledged that the proposed modification "does represent an important design change." See continuation sheet, part (c). The Examiner did not address *In re Ratti*, cited by Appellants. Rather, referring to the APA, Wilding, Anderson and Schnipelsky, the Examiner stated that the proposed modification would have been obvious, because both "series" and "parallel/series" operations are "well known in the art as effective mechanisms to deliver reagents to a detection region." Appellants note that Schnipelsky is not relied upon in any of the pending rejections.

In response, Appellants respectfully submit that it is not germane to Appellants' argument whether these principles of operation were well known in the art. As noted by the Supreme Court, "a patent composed of several element is not proved obvious merely by the demonstrating that each of its elements was, independently, known in the prior art." *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (2007). Rather, there must be a reason for combining teachings of cited art. This is because "invention in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known." *Id.*

When looking to whether there is a reason to combine the teachings of prior art references, it must be recognized that if a proposed combination changes the principle of operation from one type to another, *prima facie* obviousness has not been established, as noted above. The proposed modification changes *at least* one principle of operation. Specifically, the proposed modification changes the apparatus of the combination of Christian and Schembri from a first principle of operation ("parallel" configuration) to a second principle of operation ("parallel/series" configuration). This was conceded by the Examiner in the November 13, 2007 Office Action. Additionally, Appellants respectfully submit that the proposed modification also changes the apparatus of the combination of Christian and Schembri from a first principle of operation (roller-based device) to a second principle of operation (pump-based device). Furthermore, Appellants respectfully submit that the proposed modification also changes the apparatus of the combination of Christian and Schembri from a first principle of operation

(tabular substrate device) to a second principle of operation (bag device). As such, Appellants respectfully submit that *prima facie* obviousness has not been established.

4. The proposed modification of Christian would render the device of Christian unsatisfactory for its intended purpose because it would cause diversion of solutions, resulting in solution loss and contamination

In the Response filed on August 30, 2007, Appellants argued that the proposed modification of the combination of Christian and Schembri would render it unsatisfactory for its intended use. If the combination of Christian and Schembri were modified according to the suggestion of the March 7, 2007 Office Action, during movement of sample solution from the illustrated "Pre-processing area" to the microassay rod 10, sample solution would flow not only into microassay rod 10, but also would flow into the wash chambers 123 and 125, and the detection solution chamber 124. Further, during movement of wash solution or detection solution from the wash chambers 123 and 125 and detection solution chamber 124 to the microassay rod 10, these solutions would flow not only into the microassay rod 10, but also would flow into the proposed "pre-processing area."

Thus, the proposed modification of Christian would likely result in contamination of reagents and/or the sample. Further, the proposed modification would likely result in a reduction of the amount of sample solution detected in the microassay rod 10, because sample solution would inevitably be diverted into the wash chambers 123 and 125 and the detection solution chamber 124. Since the intended purpose of the device of Christian is the accurate detection of

samples without contamination, the proposed modification would frustrate this intended purpose. If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984); MPEP 2143.01.

The November 13, 2007 the Office Action concedes that based on his illustration, "it does seem like it would be possible for sample solution to be accidentally diverted into the wash chambers." (emphasis added). However, the Examiner stated that each of the APA, Wilding and Anderson disclose a schematic in which sample solution flows directly from a pre-processing area into a detection area without being redirected into a wash solution chamber. The Examiner thus concluded that one having ordinary skill in the art would recognize how to "redesign the apparatus of Christian to ensure that the sample is not needlessly moved into the wash chambers."

In the Response filed on May 9, 2008, Appellants argued that the Examiner's comments regarding the APA, Wilding and Anderson were misplaced. While these references do appear to disclose situations where sample solution flows directly from a pre-processing area into a detection area, the configuration in these references is significantly different from the proposed modification of Christian illustrated in the March 7, 2007 Office Action. Specifically, in the proposed modification, sample solution being moved from the inlet port to the microassay rod 10 would reach a "fork in the road" where the wash chambers 123 and 125 and detection solution chamber 124 join the microassay rod 10. A similar configuration is not disclosed by any of the cited art, including the APA, Wilding and Anderson. This configuration illustrates the problems

associated with modifying a "parallel" system to being a hybrid of a "parallel" system and a "series" system. Without increasing the expense and complexity of the device, contamination due to accidental diversion of solution into chambers 123, 124 and 125 would necessarily result from the proposed modification.

In the Advisory Action dated May 27, 2008, the Examiner stated that Appellants "should not focus on the March 7 illustration," blaming the crudeness of the drawing. However, this comment was essentially non-responsive to Appellants' argument put forth in the Response filed on May 9, 2008. Appellants submit that the basic configuration illustrated in the March 7 illustration is the only possible way to combine the cited art. The crudeness of the drawing is not germane to the fact that the combination of references would result in a device which, without addition of significant complexity and expense, would suffer from diversion of sample solution into wash chambers. Such a diversion of sample solution would render the device unsatisfactory for its intended purpose, and thus, *prima facie* obviousness is not established.

5. Christian teaches way from Schembri, Wilding, Anderson and Childers

Appellants herein argue that Christian and Schembri provide conflicting teachings and *teach away* from their combination. This argument was not previously presented. As noted above, Christian discloses that "no sophisticated machinery is required" for the use of its device. Column 4, lines 9-10. Meanwhile, Schembri discloses that external pressure is used to move solutions through the microfluidic array. Paragraphs [0099]-[0100]. This external pressure appears to be created by pumps which generate a vacuum. As such, Appellants respectfully

submit that Christian teaches away from combination with Schembri, since the complex external pressurization requirements of Schembri would run contrary to Christian's requirement of "no sophisticated machinery." Christian also teaches away from combination with Wilding, Anderson and Childers for similar reasons.

Claims 19-25 are not unpatentable under 35 U.S.C. §103(a) over Christian in view of Schembri, the Applicant's admitted prior art (APA), Wilding, Anderson and Childers, and in further view of McGarry.

It is the position of the Examiner that the combination of Christian, Schembri, the APA, Wilding, Anderson and Childers teaches the embodiments as claimed, with the exception of teaching that a carrier is a glass slide. The Examiner relies on McGarry to provide this teaching.

McGarry is directed at a biochip having a substrate 22 which may be formed of a glass slide. A reaction chamber 30 is formed by an O-ring 48, a biochip (glass slide) 20 and a base plate 32. In response to the pending rejection, Appellants respectfully submit that it would not have been obvious to combine the teachings of McGarry with that of the other cited art. McGarry specifically discloses that reaction chambers are loaded using a pipet, then sealed. See column 12, lines 31-45. In other words, McGarry does not disclose moving solution through various reaction chambers, whether by a simple roller or a more complex system using pumps and external pressurization.

On the other hand, as illustrated in Figures 20A-C of the specification and discussed at page 18, line 26 to page 22, line 24, the embodiment of claim 19 includes the previously recited

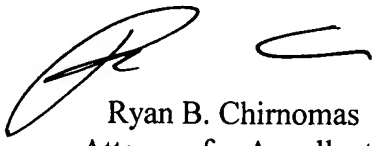
roller and a glass slide. Applicants respectfully submit that since McGarry discloses introduction of biopolymers using a pipet and subsequent sealing, rather than movement between chambers, it is incompatible with the teachings of claim 19, and all claims dependent thereon. One having ordinary skill in the art would not have had a reason to combine the teachings of McGarry, where the solutions are stationary in the device, with the teachings of Christian, Schembri, the APA, Wilding, Anderson and Childers, where solutions are moved through the device.

CONCLUSION

If this paper is not timely filed, appellants hereby petition for an appropriate extension of time. The fee for any such extension may be charged to Deposit Account No. 50-2866, along with any other additional fees that may be required with respect to this paper.

Respectfully submitted,

WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP



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(VII) CLAIMS APPENDIX

Claim 2. A biochip cartridge comprising:

a tabular substrate member formed using an elastic material; and

a flexible cover airtightly attached to the surface of said substrate member,

wherein at least a collection area for storing biopolymers, a preprocessing area for applying preprocessing to said biopolymers, a detection area for detecting biopolymers from said preprocessed biopolymers and gaps serving as a flow path for connecting said collection area, said preprocessing area and said detection area are formed in said substrate member, so that biopolymers can be successively transferred from said collection area through said preprocessing area to said detection area, and

wherein said biopolymers are transferred by pressing said cover with a roller-like rigid body and squeezing each gap formed in said substrate member from said collection area through said preprocessing area toward said detection area.

Claim 4. The biochip cartridge of claim 2, wherein a pocket to be filled with a preprocessing solution is formed in said substrate member and a preprocessing solution stored in said pocket is driven out into said preprocessing area when said roller is pressed down on said pocket.

Claim 5. The biochip cartridge of claim 2, wherein a waste liquid reservoir for storing waste liquid drained out of said detection area is formed in said substrate member.

Claim 6. The biochip cartridge of claim 2, wherein said cover is attached to both the top and bottom surfaces of said substrate member.

Claim 7. The biochip cartridge of claim 2, wherein gaps serving as said flow path formed in said substrate member are squeezed as said roller-like rigid body is pressed down on said gaps.

Claim 8. The biochip cartridge of claim 6, wherein said covers are formed using plastics or silica.

Claim 9. The biochip cartridge of claim 6, wherein said cover is formed using a transparent material so that optical detection can be achieved at least in said detection area.

Claim 10. The biochip cartridge of claim 4, wherein a plurality of said pockets for storing preprocessing solutions are formed in different positions so that when said substrate member is squeezed with said roller-like rigid body, a preprocessing solution is driven out of each of said pockets into said preprocessing area in a time-differentiated manner.

Claim 11. The biochip cartridge of claim 2, wherein said substrate member is formed into a wedge shape so that the thickness thereof gradually decreases from said collection area toward

said detection area.

Claim 12. The biochip cartridge of claim 2, wherein a valve for checking the flow of solutions is provided in said flow path and said valve opens when a solution flowing through said flow path is pressurized.

Claim 13. The biochip cartridge of claim 2, wherein said substrate member is formed using a plastic-deformable material or gel.

Claim 19. The biochip cartridge of claim 2, wherein a preprocessing mechanism for performing preprocessing in order to turn biological samples into measurable biopolymers is provided in said substrate member and a slide glass type biopolymer microarray is mounted on said biochip cartridge, so that said processed biopolymers can be fixed in the array area of said microarray.

Claim 20. The biochip cartridge of claim 19, wherein the short and long sides of said slide glass type biopolymer microarray are not greater than 25 ±1 mm and 75 ±1 mm, respectively.

Claim 21. The biochip cartridge of claim 19, wherein said preprocessing mechanism includes:

a collection area for storing biological samples;

a preprocessing solution storage for storing preprocessing solutions to be applied to said biological samples;

a washing solution storage for storing washing solutions used to clean post-preprocessing biopolymers;

a combination area for performing hybridization on said slide glass type biopolymer microarray;

a waste liquid reservoir for storing waste liquid; and

a flow path for connecting all of said areas and storages;

so that biological samples can be successively transferred from said collection area through said preprocessing area to said detection area.

Claim 22. The biochip cartridge of claim 19, wherein said biological samples are transferred by squeezing said substrate member with a rigid roller in the direction from said collection area toward said combination area.

Claim 23. The biochip cartridge of claim 19, wherein said slide glass type biopolymer microarray is airtightly mounted on said substrate member in such a manner that the array area of said slide glass type biopolymer microarray is opposed to said combination area.

Claim 24. The biochip cartridge of claim 19, wherein a cover formed using a rigid material is attached to said substrate member and a cavity is formed therebetween, said slide glass type biopolymer microarray being airtightly mounted on said substrate member in such a manner that the array area of said slide glass type biopolymer microarray is opposed to said combination area.

Claim 25. The biochip cartridge of claim 19, wherein said preprocessing mechanism includes a mechanism for extracting DNA or RNA.

(IX) EVIDENCE APPENDIX

None presented.

(X) RELATED PROCEEDINGS APPENDIX

None.